

studies. Certainly my results agree that it is the tiny, delicate insects that were most in evidence. The only major differences between the findings of our respective studies appears to be the absence of Psychodidae from Mr Roper's survey, which intrigues me.

On the point raised by Mr Roper regarding the importance of these hardy insects for insectivorous birds and spiders, I would comment that bats can also be added to that list. Bats feed in the winter with the likelihood of this occurring being greater in some species of bat than in others. It is certainly true that the likelihood of bats feeding in winter is also related to temperature. In the milder parts of the UK, such as Cornwall, feeding by lesser horseshoe bats *Rhinolophus hipposideros* (Bechstein) is very frequent. Although winter temperatures above 10 °C support an abundance of active insects that make foraging by bats worthwhile, lesser horseshoe bats in Cornwall are known to feed at temperatures as low as 5 °C.

Trichoceridae, Tipulidae and Mycetophilidae are all important prey families in the winter diet of the lesser horseshoe bat in Cornwall, with Chironomidae and Psychodidae present at lower levels.

I feel it is true to say that these hardy winter-active insects are undoubtedly of great importance for those winter-feeding insectivores as well as proving interesting in their own right.—CAROL WILLIAMS, 10 Treveryn Parc, Budock Water, Falmouth TR11 5EH

Significance of the continued existence of a population of *Emura amerinae* (L.) (Hymenoptera: Tenthredinidae) after 25 years for the identification of factors determining hostplant acceptability

Abstract. An infestation by *Emura amerinae* on *Salix pentandra* was observed to continue over a period of 25 years. It is suggested that ontogenetic ageing of the host probably does not influence the development of populations of this sawfly as much as some previous studies have indicated. The variable reaction of the host to attack, depending probably mainly on site conditions and their effect on growth, greatly affects the availability of oviposition sites for the next generation of sawflies.

Roininen, Price & Tahvanainen (1993) studied the colonisation of a population of the shoot-galling sawfly *Emura amerinae* (L.) (Hymenoptera: Tenthredinidae) on young *Salix pentandra* L. (Bay Willow) growing from seed in eastern Finland. They reached the conclusion that the complete extinction of the sawfly at this site, just seven years after its first appearance, was probably mainly the result of ontogenetic ageing of the hostplants.

In 1976 (Liston, 1982) I found an isolated occurrence of *S. pentandra* at Beecraigs Country Park, Bathgate Hills, West Lothian, Scotland, with a very strong infestation by *E. amerinae*. During the first four years of observation, infestation remained exceedingly heavy, with several hundred fresh galls each year. It was noted in 1976 that the plants originated as a type of coppice growth: three "bushes" had grown from a stem of approximately 25 cm breast-height diameter lying on the ground. In August 2001 the site was revisited and the plants observed to still support a population of the sawfly. Around seventy fresh galls were present on the upper, leading shoots of the willows, which are now approx. 5 m in height (1.75 m when first found). The site conditions, in a wet flush on a former clearfell area, seem to be quite favourable for *pentandra*.

That *E. amerinae* is still present after 25 years contrasts markedly with the observations of Roininen *et al.* (l.c.), and suggests that ontogenetic ageing may not

be the only important factor determining acceptability of the hostplant to this sawfly. The age of this host, arising as it did as coppice growth, must be at least 30 years. Personal observations on larger, older trees of *pentandra* support the conclusion of several authors, that *amerinae* greatly prefers younger plants, but the progress of the infestation at Beecraigs leads me to believe that plant vigour is probably a more important determinant of host acceptability than ontogenetic ageing. The slow height increment in these bushes seems contradictory to a state of vigorous growth, but it is probable that their physiological vigour was masked by the stunting effect of the extremely heavy sawfly attack. This is supported by the large increase in length of new shoots since the weakening of the infestation.

Conspicuous in the Beecraigs infestation was the complete loss of apical dominance in the host after sustained attack and resulting dieback of the leading shoots. Subsequently the sawfly oviposited in new shoots growing from ungalled tissue lower in the plant. Kopelke (1999, p. 111) considers that *E. amerinae* populations exhibit strong resource-regulating effects, which by his definition are effects controlled solely by the action of the gall-maker. It is suggested that in *amerinae* the reaction of the hostplant to attack is nevertheless of great importance to the development, or even the continued existence, of the sawfly population. If the plant is sufficiently vigorous, the net number of potential oviposition sites may not be greatly diminished by previous infestation. Conversely, young plants on a site with sub-optimal nutritional or hydrological conditions might fail to produce any new shoots if weakened by a severe attack.

Factors influencing host acceptability, as pointed out by Roininen *et al.*, have a wide significance in the relationship between population dynamics of herbivorous insects and growth of woody plants. Amongst the sawflies, particularly some of the gall-makers (*Pontania*, *Euura*) exhibit a clear preference for vigorously growing shoots (Kopelke & Amendt, 2001). This is expressed not just in heavier attack on young plants: coppice growth is often preferred to more mature parts of potential hosts (Kopelke, 1999).—A. D. LISTON, Amselweg 84, D-84160 Frontenhausen, Germany.

REFERENCES

- Kopelke, J.-P., 1999. Gallenerzeugende Blattwespen Europas—Taxonomische Grundlagen, Biologie und Ökologie (Tenthredinidae: Nematinae: *Euura*, *Phyllocolpa*, *Pontania*). *Courier Forschungsinstitut Senckenberg* **212**, 183 pp.
- Kopelke, J.-P. & Amendt, J., 2001. Katastrophe oder Glücksfall? Auswirkungen von Überschwemmungen auf gallenerzeugende Insekten der Weiden. *Natur und Museum*, Frankfurt a.M. **131**: 8–19.
- Liston, A.D., 1982. Aspects of the biology of *Euura amerinae* (Linnaeus) (Hymenoptera, Tenthredinidae). *Zeitschrift für angewandte Entomologie*, **94**: 56–61.
- Roininen, H., Price, P.W. & Tahvanainen, J., 1993. Colonization and extinction in a population of the shoot-galling sawfly, *Euura amerinae*. *Oikos*, **68**: 448–454.